CLAIMS

What is claimed is:

1. A brake band mechanism for an automatic transmission having a brake drum, said mechanism comprising:

a brake band encircling the brake drum, said brake band including opposing ends, said brake band operable to be compressed and expanded around the brake drum;

a hydraulic servo; and

a linkage coupled to the servo and the brake band, said servo activating the linkage to provide positive compression and expansion to the band for applying friction to the brake drum to control its speed of rotation.

2. The mechanism according to claim 1 wherein the hydraulic servo is a two-stage servo.

3. The mechanism according to claim 2 wherein the two-stage servo provides a rapid activation of the linkage during a first stage to rapidly expand the brake band, and a controlled compression and expansion of the brake band during a second stage.

4. The mechanism according to claim 1 further comprising a position sensor, said position sensor sensing the position of a piston of the servo.

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5. The mechanism according to claim 1 further comprising at least one linkage sensor, said at least one linkage sensor sensing the position of the linkage.

6. The mechanism according to claim 1 further comprising at least one band strain sensor, said at least one band strain sensor measuring the strain on the brake band.

7. The mechanism according to claim 1 wherein the servo includes a first piston and a second piston, said first piston being smaller than the second piston, said first piston being operable to provide rapid movement of the brake band and said second piston being operable to provide fine adjustments of the brake band.

8. The mechanism according to claim 1 further comprising a clip structure, said clip structure being mounted to an end of the brake band and being coupled to the linkage.

9. A brake band mechanism for an automatic transmission having a brake drum, said mechanism comprising:

a brake band encircling the brake drum, said brake band including opposing ends, said brake band operable to be compressed and expanded around the brake drum;

a two-stage hydraulic servo, said servo including a servo rod position sensor for determining the position of a stroke rod of the servo, said two-stage servo providing a rapid activation of the linkage during a first stage to rapidly expand the

brake band, and a controlled compression and expansion of the brake band during a second stage; and

a linkage coupled to the servo and the brake band; and

a clip structure, said clip structure being mounted to an end of the brake band and being coupled to the linkage, said servo activating the linkage to provide positive compression and expansion to the band for applying friction to the brake drum to control its speed of rotation.

10. The mechanism according to claim 9 wherein the servo includes a first piston and a second piston, said first piston being smaller than the second piston, said first piston being operable to provide rapid movement of the brake band and said second piston being operable to provide fine adjustments of the brake band.

11. The mechanism according to claim 9 further comprising at least one linkage sensor, said at least one linkage sensor sensing the position of the linkage.

12. The mechanism according to claim 9 further comprising at least one band strain sensor, said at least one band strain sensor measuring the strain on the brake band.

13. A method of controlling the shift of an automatic transmission comprising:

providing a brake band for engaging a brake drum of an automatic transmission, said band being positively controlled for both apply and release pressure around said brake drum;

applying a first fast active compression force to said band to a predetermined position; and

providing a closed loop control of pressure on the band in both positive apply and release directions for controlling shift parameters of the transmission, based on a predetermined input.

14. The method of claim 13 wherein said shift parameters being based on band strain, seat acceleration, shaft torque, or a combination of these.

15. The method of claim 13 wherein said shift control is accomplished by a closed loop software control controlling an apply solenoid.

16. The method of claim 13 wherein a two-stage servo is used for controlling said brake band.

17. The method of claim 16 wherein said two-stage servo has a first stage for rapidly applying band pressure, and a second stage for providing positive finite control of both apply and release pressures on said brake band during the shift.

18. The method of claim 17 wherein said method comprises controlling said shift by first ramping up the pressure at the beginning of said shaft and releasing pressure toward the end of said shift.

19. The method of claim 18 wherein said band is locked in said applied position after the completion of the shift.

20. The method of claim 18 wherein the switch between ramping up and closed loop control is determined by inputs selected from the group consisting of a servo sensing position, strap strain, time and servo pressure, strain of the apply strut attached to the band, engine RPM, an accelerometer, transmission torque output, or combinations of these.

21. The method of claim 18 wherein both apply and release pressures are independently controlled.

22. The method of claim 21 wherein solenoids are used to independently control the apply and release hydraulic pressure.

23. The method of claim 17 wherein said first stage is a smaller volume piston than said second stage.